CLAIMS

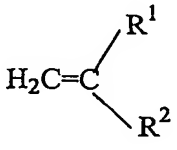
1. Core-shell nanoparticles comprising:

(a) a core which comprises a water insoluble polymer or copolymer, and

(b) a shell which comprises a hydrophilic polymer or copolymer;

said nanoparticles being obtainable by emulsion polymerization of a mixture comprising, in an aqueous solution, at least one water-insoluble styrenic, acrylic or methacrylic monomer and:

(i) a monomer of formula (I):



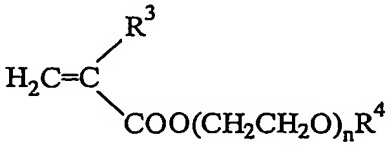
(I)

wherein

R^1 represents hydrogen or methyl, and

R^2 represents -COOAOH, -COO-A-NR^9R^{10} or -COO-A-$N^+R^9R^{10}R^{11}$ X^-, in which A represents C_{1-20} alkylene, R^9, $R^{10}$and R^{11} each independently represent hydrogen or C_{1-20} alkyl and X represents halogen, sulphate, sulphonate or perchlorate, and

a water-soluble polymer of formula (II)



(II)

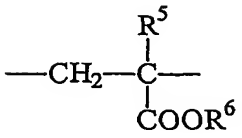
wherein

R^3 represents hydrogen or methyl,

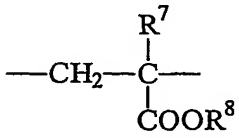
R^4 represents hydrogen or C_{1-20} alkyl, and

n is an integer such that the polymer of formula (I) has a number-average molecular weight of at least 1000; or

(ii) a hydrophilic copolymer which comprises repeating units of formulae (III) and (IV):



(III)



(IV)

wherein

R^5 and R^7 each independently represent hydrogen or methyl,

R^6 represents hydrogen, -A-NR^9R^{10} or -A-$N^+R^9R^{10}R^{11}$ X^-, in which A represents C_{1-20} alkylene, R^9, $R^{10}$and R^{11} each independently represent hydrogen or C_{1-20} alkyl and X represents halogen, sulphate, sulphonate or perchlorate and

R^8 represents C_{1-10} alkyl.

2. Nanoparticles according to claim 1 wherein the core comprises poly(C_{1-10} alkyl (meth)acrylate), polystyrene or a copolymer formed from monomers which are acrylic, methacrylic or styrenic monomers.

3. Nanoparticles according to claim 1 or 2 wherein the core comprises poly(methyl methacrylate).

4. Nanoparticles according to any one of claims 1 to 3 which are obtainable by emulsion polymerization of methyl methacrylate in an aqueous solution comprising poly(ethylene glycol) methyl ether methacrylate and 2-(dimethyloctyl) ammonium ethyl methacrylate bromine.

5. Nanoparticles according to any one of claims 1 to 3 which are obtainable by emulsion polymerization of methyl methacrylate in an aqueous solution comprising a copolymer of methacrylic acid and ethyl acrylate.

6. Nanoparticles according to any one of claims 1 to 3 which are obtainable by emulsion polymerization of methyl methacrylate in an aqueous solution comprising a copolymer of 2-(dimethylamino)ethyl methacrylate and C_{1-6} alkyl methacrylate.

7. Nanoparticles according to any one of the preceding claims which have a number-average particle diameter measured by scanning electron microscopy of from 50 to 1000 nm.

8. Nanoparticles according to any one of the preceding claims which further comprise a fluorescent chromophore.

9. A process for preparing nanoparticles according to any one of the preceding claims, said process comprising emulsion polymerization of a water-insoluble monomer in an aqueous solution comprising:

(i) a monomer of formula (I) and a polymer of formula (II), or

(ii) a hydrophilic copolymer which comprises repeating units of formulae (III) and (IV).

10. Nanoparticles according to any one of claims 1 to 8 which further comprise at least one pharmacologically active agent adsorbed at the surface of the nanoparticles.

11. Nanoparticles according to claim 10 wherein the pharmacologically active agent is a disease-associated antigen.

12. Nanoparticles according to claim 11 wherein the antigen is a deoxyribonucleic acid, ribonucleic acid, oligodeoxynucleotide, oligonucleotide or protein.

13. Nanoparticles according to claim 11 or 12 wherein the antigen is a microbial antigen or a cancer-associated antigen.

14. Nanoparticles according to any one of claims 11 to 13 wherein the antigen is a human immunodeficiency virus-1 (HIV-1) antigen.

15 . Nanoparticles according to claim 14 wherein the antigen is HIV-1 Tat protein or an immunogenic fragment thereof.

16. A process for preparing nanoparticles according to any one of claims 10 to 15, said process comprising adsorbing a pharmacologically active agent at the surface of nanoparticles according to any one of claims 1 to 8.

17. A pharmaceutical composition comprising nanoparticles according to any one of claims 10 to 15 and a pharmaceutically acceptable excipient.

18. A method of diagnosing, treating or preventing a condition in a subject said method comprising administering an effective amount of nanoparticles according to any one of claims 10 to 15 or a pharmaceutical composition according to claim 17 to a subject in need of such treatment.

19. A method of generating an immune response in a subject, said method comprising administering nanoparticles according to any one of claims 11 to 15 in a therapeutically effective amount.

20. A method of preventing or treating HIV infection or AIDS, said method comprising administering nanoparticles according to any one of claims 11 to 15 in a therapeutically effective amount.

21. Nanoparticles according to any one of claims 10 to 15 or a pharmaceutical composition according to claim 17 for use in a method of treatment of the human or animal body by therapy or a diagnostic method practised on the human or animal body.

22. Use of nanoparticles according to any one of claims 10 to 15 for the manufacture of a medicament for diagnosing, treating or preventing a condition in a subject.

23. Use of nanoparticles according to any one of claims 10 to 15 for the manufacture of a medicament for preventing or treating HIV infection or AIDS.